AQA Qualifications

AQA Level 2 Certificate

FURTHER MATHEMATICS

Level 2 (8365)

Mark Scheme

Worksheet 8

Functions

Version 2.0

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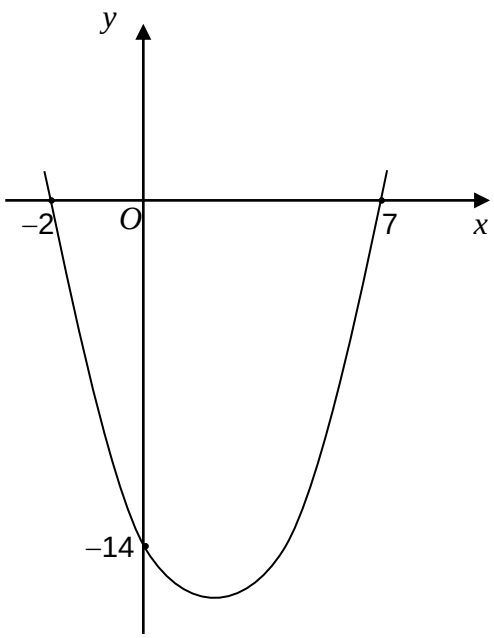
Glossary for Mark Schemes

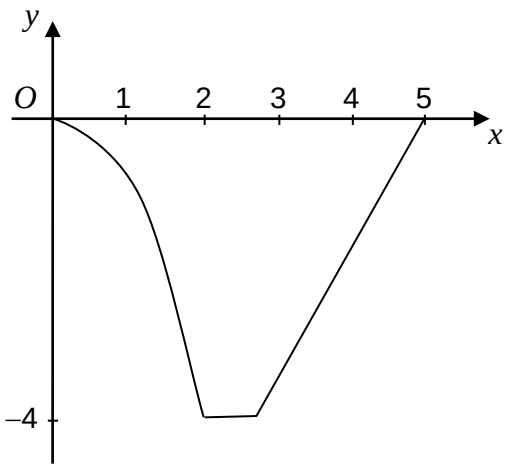
These examinations are marked in such a way as to award positive achievement wherever possible. Thus, for these papers, marks are awarded under various categories.

M	Method marks are awarded for a correct method which could lead to a correct answer.
A	Accuracy marks are awarded when following on from a correct method. It is not necessary to always see the method. This can be implied.
B	Marks awarded independent of method.
M Dep	A method mark dependent on a previous method mark being awarded.
B Dep	A mark that can only be awarded if a previous independent mark has been awarded.
ft	Follow through marks. Marks awarded following a mistake in an earlier step.
SC	Special case. Marks awarded within the scheme for a common misinterpretation which has some mathematical worth.
oe	Or equivalent. Accept answers that are equivalent. eg, accept 0.5 as well as $\frac{1}{2}$

8 Functions

Question	Answer	Mark	Comments
1	$2x^3 - 250 = 0$ $x^3 = \frac{250}{2}$ $x = 5$	M1 M1 A1	 oe
2	$(-3)^2 + a(-3) - 8 = 13$ $9 - 8 - 13 = 3a$ $a = -4$	M1 M1 A1	 oe Allow 1 error
3	$(x + 2)^2 + 3(x + 2) - 10$ $x^2 + 2x + 2x + 4 + 3x + 6 - 10$ $x^2 + 7x$ $= x(x + 7)$	M1 M1 A1	 oe Allow 1 error
4(a)	$f(x) \geqslant 6$	B1	
4(b)	$-11 \leqslant f(x) \leqslant 13$	B1	B1 For –11 or 13 seen
4(c)	$f(x) > 48$	B1	
5(a)	Not defined when $x = 3$ or cannot divide by 0 when $x = 3$	B1	oe
5(b)	$x \geqslant a$ where $a \geqslant 5$ or $x > a$ where $a \geqslant 5$	B1	eg $x \geqslant 5$ $x > 6$ Allow list of x values if all are $\geqslant 5$

Question	Answer	Mark	Comments
6	Either $3 - 2x = -5$ or $3 - 2x = 5$	M1	
	$a = -1$	A1	
	$b = 4$	A1	SC2 $a = 4$, $b = -1$
7	Attempt to complete the square in the form $(x + 3)^2$	M1	
	$(x + 3)^2 - 9 + a$	A1	oe
	$a = 20$	A1	
8(a)	$(x + a)(x + b)$	M1	$ab = -14$ or $a + b = -5$
	$(x - 7)(x + 2)$	A1	
8(b)		B3	B1 Curve through their (7, 0) and (–2, 0) (from 8(a)) B1 Curve through (0, –14) B1 Smooth U shape

Question	Answer	Mark	Comments
9		B3	B1 For each part
10	(3, 0) and (7, 0) marked or used (1, 2) and (4, –1) marked or used Either of their triangular areas calculated correctly $\frac{1}{2} \times 3 \times 2$ and $\frac{1}{2} \times 4 \times 1$ = 3 : 2	M1 M1 M1 A1	
11	$2y + a = \sqrt{x}$ $f^{-1}(x) = (2x + a)^2$ $f^{-1}(3a) = (7a)^2$ or $49a^2 = 306.25$ 2.5	M1 M1 M1 A1	oe oe oe
12	$\frac{2\left(\frac{5}{x+1}\right)-1}{4}$ $\frac{9-x}{4x+4}$ or $\frac{-x+9}{4x+4}$	M1 A1	
13	$-\frac{1}{2} < x < 5$	B2	B1 for stating must be negative or correct inequality with one or two ≤ symbols in place of <